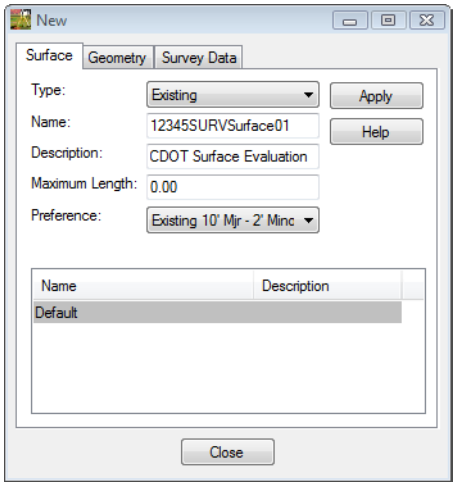
LAB 7 - DTM Evaluation

Lab 7.1 - Exporting Survey Data to Surface for Evaluation

Exporting to a DTM surface will create a triangulation network used for displaying contours, features and spot elevations.

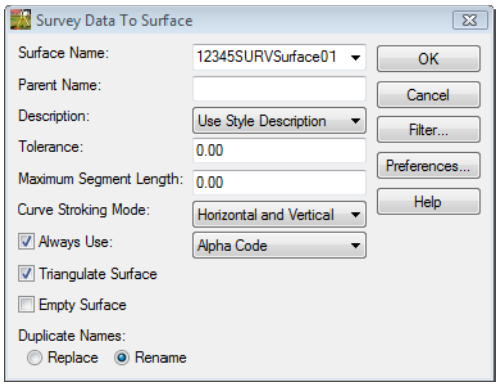
1. Verify the **12345SURVFieldbook01** fieldbook is active as this is the survey data to be exported to a DTM. You can tell which fieldbook is active by the red box around the fieldbook button.
2. Write Survey Data to Graphics if they are not already. The planimetrics will make viewing in the MicroStation model easier.
3. From the pull-down menu, select **File > New**. The ***New*** dialog will appear.
4. Select the **Surface** tab.
5. Key in the surface Name: **12345SURVSurface01**
6. Key in the Description: **CDOT Surface Evaluation**

   Note: Key in any additional file information in the ***Description*** field of the dialog, such as **Date**, **User**, and **Design file** name. You have up to 34 characters even though you may not see all the characters in the Description field.
7. Keep the **Maximum Length** set to ***0***
8. Set pick list to the Preference: **Existing 10' Mjr – 2' Minor**

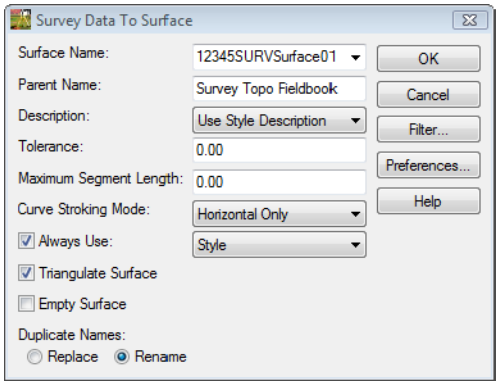


9. **<D>** the **Apply** then **Close** buttons.

10. From the pull down menu **Survey > Survey Data to Surface**. The ***Survey Data to Surface*** dialog will appear.



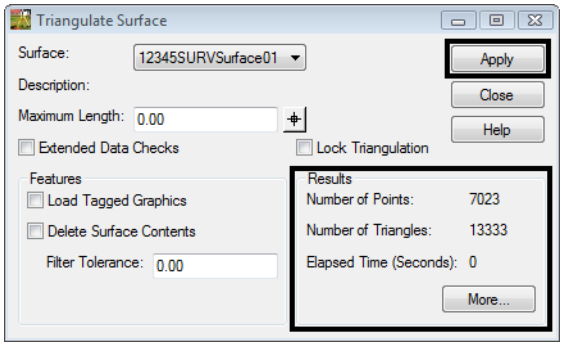
11. Pick from the list in the ***Surface Name*** **12345SURVSurface01** in the Surface Name field.
12. Set the ***Description*** to **Use Style Description**
13. Keep the ***Tolerance*** and ***Maximum Segment Length*** set to **0.00**
14. Set the ***Curve Stroking Mode*** to **Horizontal Only**
15. Check ***Always Use***: **Style**
16. Check ***Triangulate Surface***



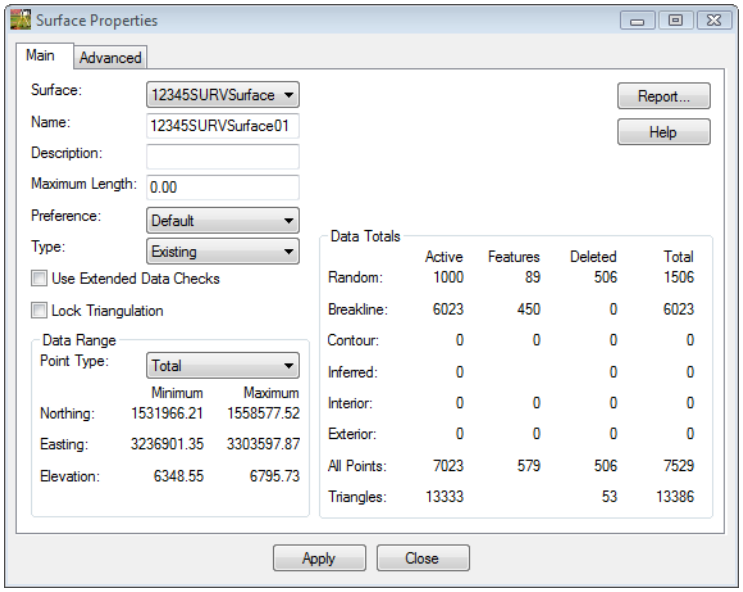
17. **<D>** the **OK** button the ***Survey Data to Surface*** dialog will close and the ***Triangulate Surface*** dialog will appear.

18. Leave all settings unchecked. ***Maximum Length*** should be set to **0.00**.

19. **<D>** the **Apply** button. The Results section of the dialog should look similar to the image below. (Numbers may not match exactly)



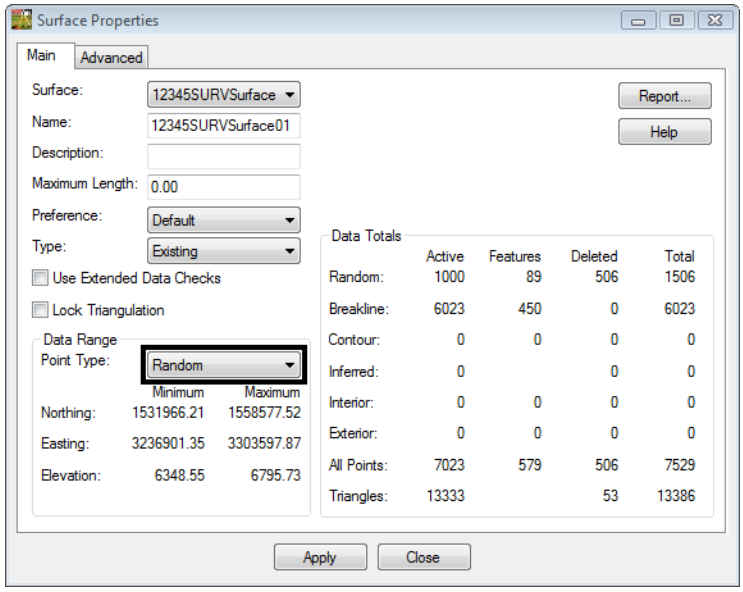
20. **<D>** the **More** button. The ***Surface Properties*** dialog will appear.



21. Verify you are working with the correct surface ***12345SURVSurface01***.

22. Review the section for ***Data Rang***e. The Northing, Easting, and Elevation values should fall within the project limits.

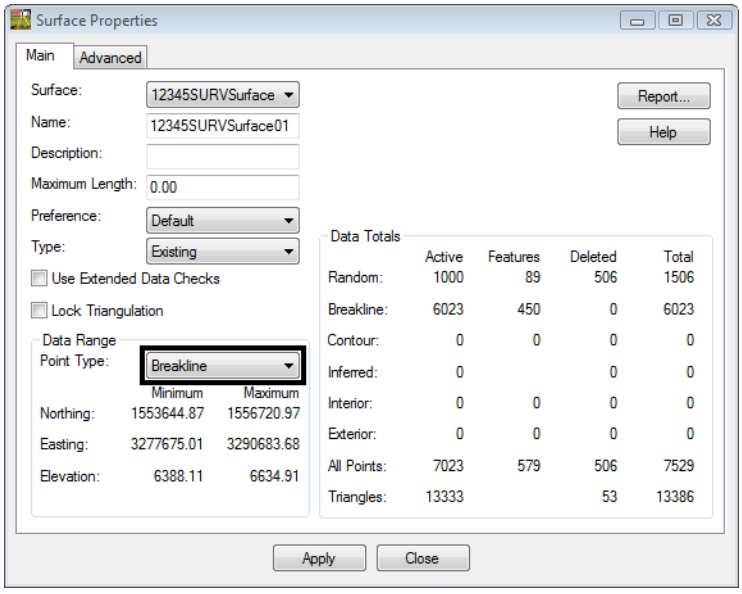
23. In the ***Data Range*** section, change the drop down selection to **Random**.



24. Review the ***Random*** point range.

Note: As part of your evaluation of the surface you are looking for a large error in the data such as a zero elevation, or truncated coordinates.

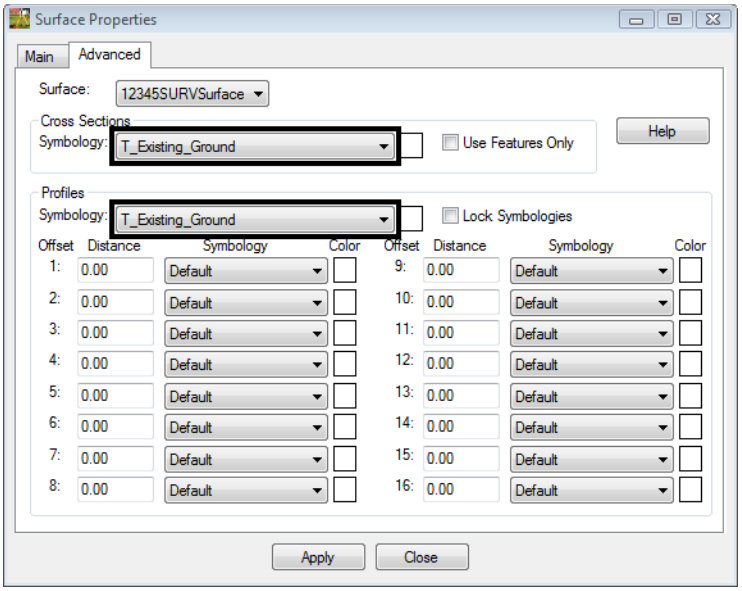
25. In the ***Data Range*** section, change the drop down selection to **Breakline**.



26. Review the ***Breakline*** point range.

Note: Having the flexibility to review our data by type can help when trying to track down errors in the DTM.

27. On the ***Advanced*** tab choose **Cross Sections - Symbology: T_Existing_Ground**
28. On the ***Advanced*** tab choose **Profiles - Symbology: T_Existing_Ground**

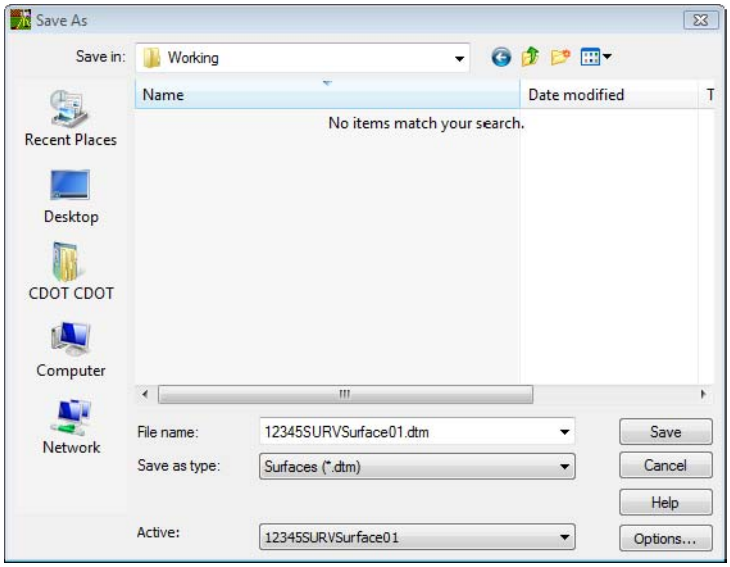


29. **<D> Apply** then **Close** in the ***Surface Properties*** dialog.
30. **<D>** the **Close** button in the ***Triangulate Surface*** dialog.
31. Use the ***Workspace*** pane scroll **arrows** to view the ***Surfaces*** tab.
32. Verify ***12345SURVSurface01*** is the active surface.

    Note: You can change the active surface from the pull down menu **Surface > Active Surface**; highlight the surface name and **<D>** the **Apply** button.

33. From the pull-down **File > Save > Surface**. The ***Save As*** dialog will appear with the **Save as type** set to **Surfaces (*.dtm)**.

34. Verify you are in the correct project directory. ***C:\Projects\12345\ROW_Survey\Working***



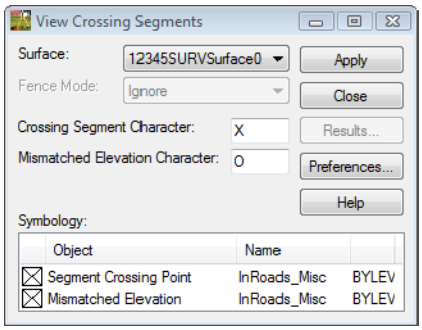
35. The file name should match the **Active** name at the bottom of the **Save As** dialog. If necessary, use the drop-down arrow in the **Active** field and reselect the desired name to ensure the saved file name will match the surface name.

    Note: Ensuring that the saved Surface name in the project folder matches the Surface name displayed in InRoads explorer will minimize any confusion.

36. **<D>** the **Save** then **Cancel** button. The file will be saved to disk and the ***Save As*** dialog will close.

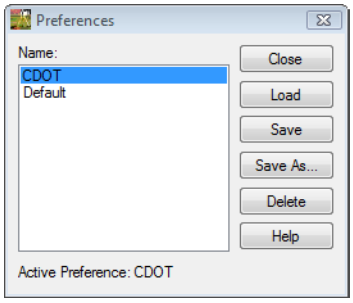
Lab 7.2 - Correcting Crossing Segments

1. From the pull-down menu select, **Surface > View Surface > Crossing Segments**. The ***View Crossing Segments*** dialog will appear.



2. Verify from the ***Surface*** drop down **12345SURVSurface01** is selected.

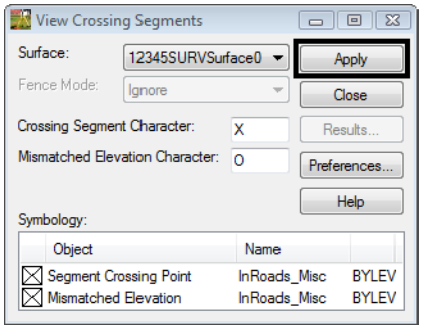
3. **<D>** the **Preferences…** button. The ***Preferences*** dialog will appear.



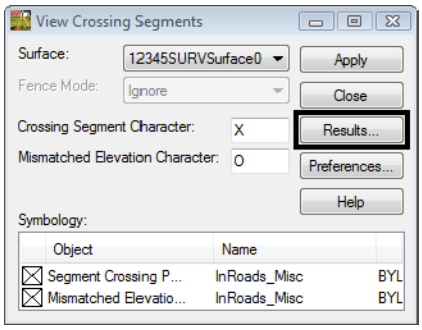
4. ***Select*** the **CDOT** preference

5. **<D>** the **Load** then **Close** buttons.

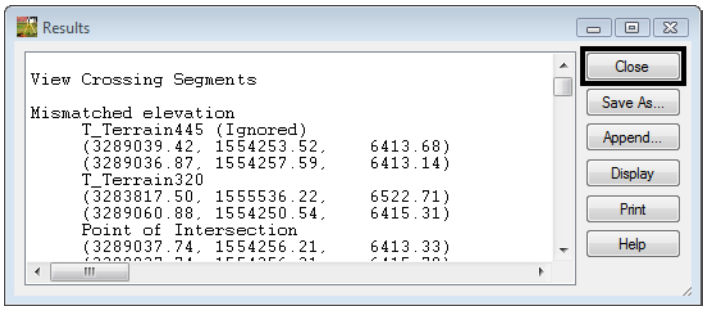
6. **<D>** the **Apply** button from the ***View Crossing Segments*** dialog. The graphics ***X*** and ***O*** will be displayed and the ***Results*** button will be come active.



7. **<D>** the **Results** button. The ***Results*** report will appear locating all mismatched and crossing segments.



8. Review the results.

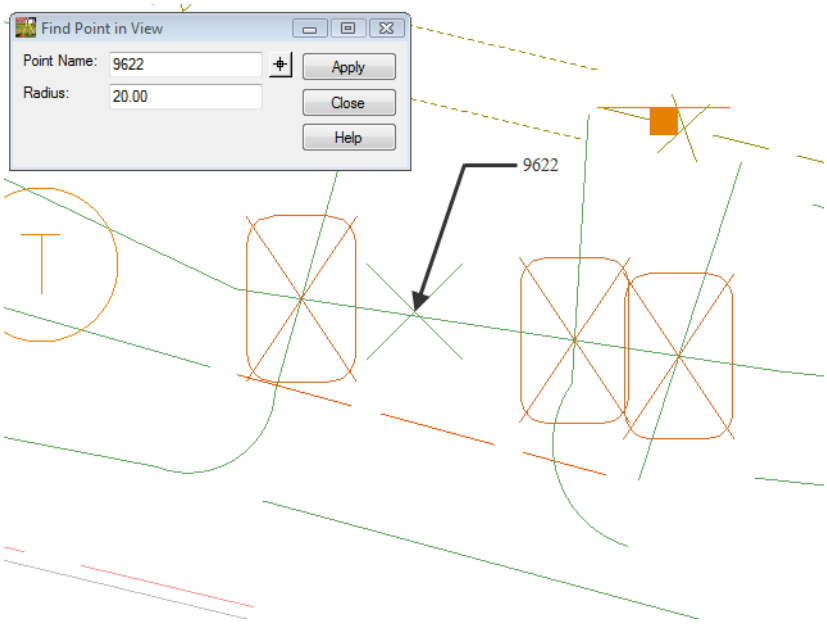


Note: This report can be saved to the design file or text file if needed.

9. **<D>** the **Close** button on the ***Results*** dialog.

10. From the pull down menu, select **Survey > Find Point in View**

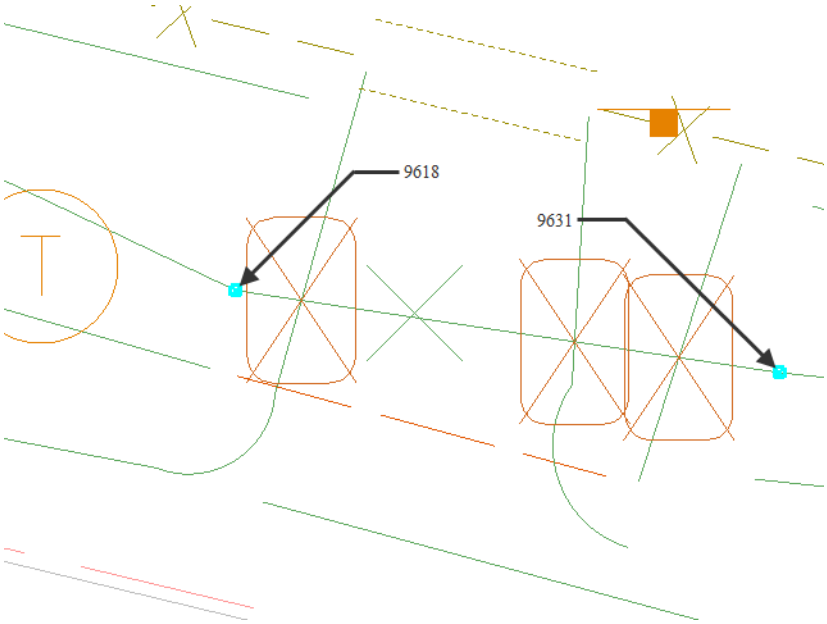
11. Find ***Point Name:* 9622** Radius: **20**



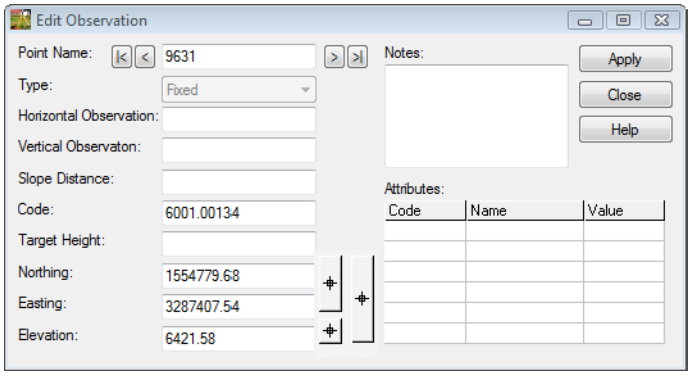
Note: The terrain breakline running left to right is crossing multiple other terrain breaklines. In this particular situation a solution would be to break the terrain line using a Start control code.

12. **<D>** the ***Fieldbook*** button from the Survey toolbar. The survey ***Fieldbook Data*** dialog will appear.

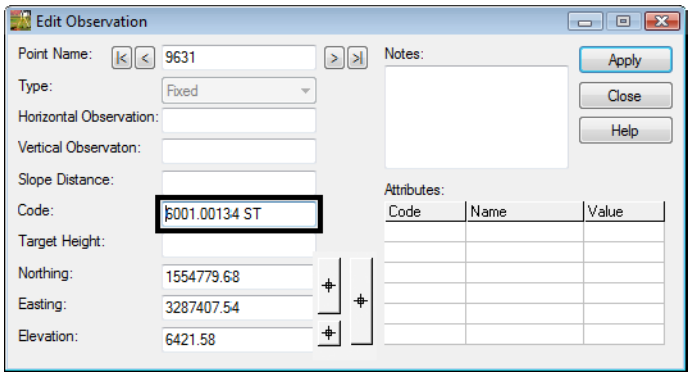
13. Locate point name **9631** in the fieldbook using the ***Select Observation*** button from the ***Fieldbook Data*** dialog.



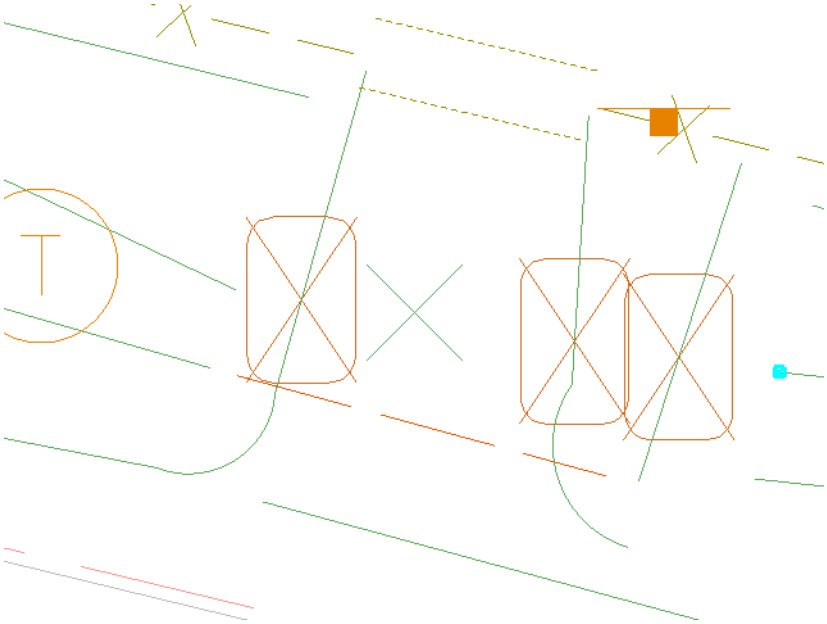
14. **<R>** the point name **9631** and select **Edit** from the shortcut menu or double click the point name. The ***Edit Observation*** dialog will appear for point ***9631***



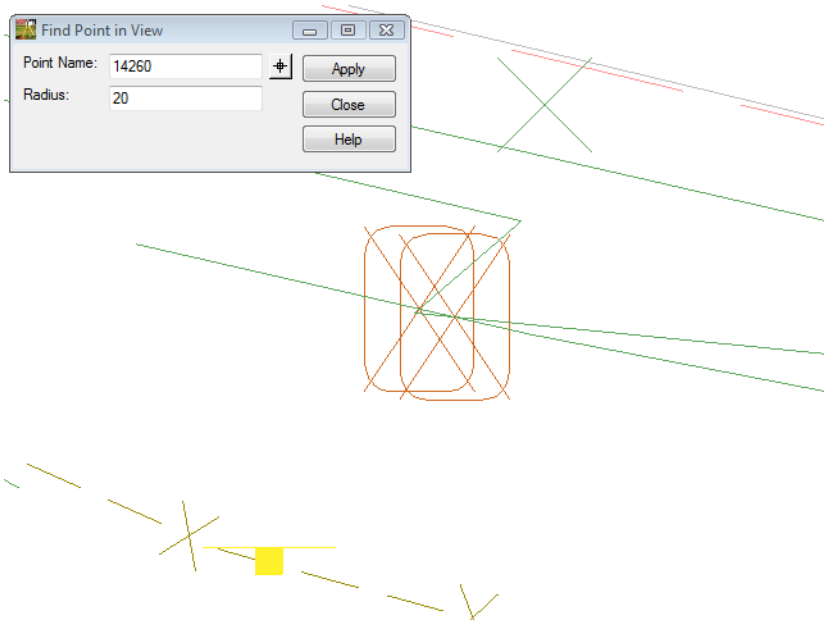
15. Type in the **Code**: ***6001.00134 ST***



16. **<D>** the **Apply** then **Close** buttons.
17. Review your results dynamically from the fieldbook. The terrain breakline was restarted so the breaklines are no longer crossing.



18. From the pull-down menu, select **Survey > Find Point in View**
19. Find ***Point Name:*** **14260** Radius: **20**

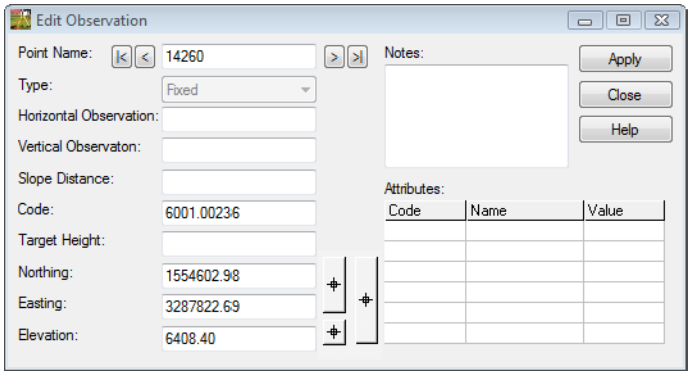


Note: The terrain breakline is overlapping slightly where the line zig-zags. In this particular situation a solution would be to edit the XY location of the point.14

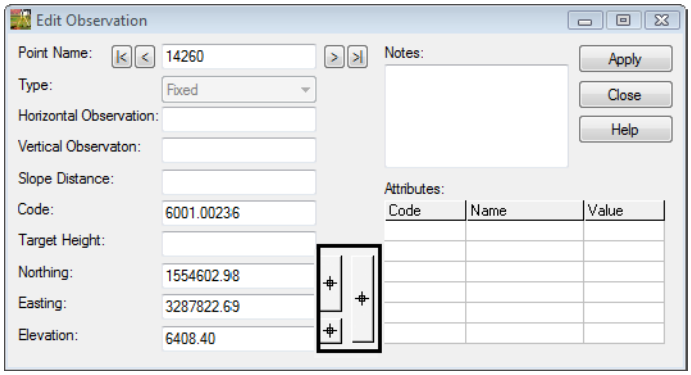
20. **<D>** the ***Fieldbook*** button from the Survey toolbar. The survey ***Fieldbook Data*** dialog will appear.

21. Locate point name **14260** in the fieldbook using the **Select Observation** button from the ***Fieldbook Data*** dialog.

22. **<R>** the point name **14260** and select **Edit** from the shortcut menu or double click the point name. The ***Edit Observation*** dialog will appear for point ***14260***



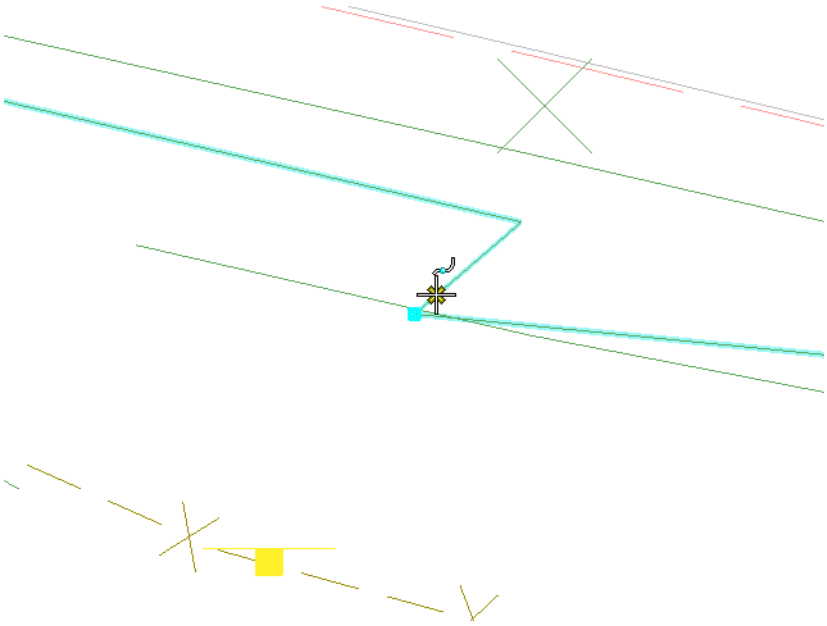
23. **<D>** the **Target** button. The ***Edit Observation*** dialog will minimize allowing to select a point in the MicroStation view.



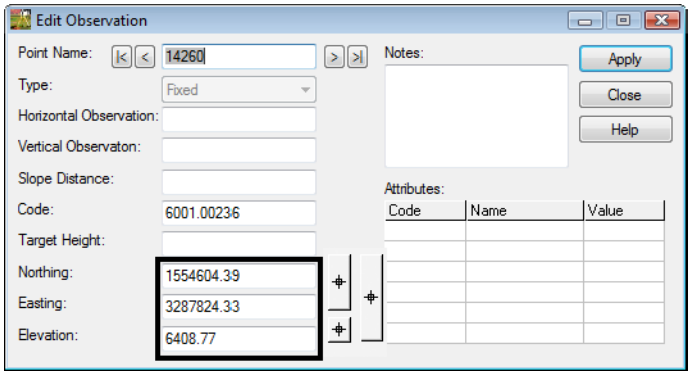
24. Using MicroStation snaps set the temporary snap to **Nearest**.

25. Hold down the **Ctrl** and **Shift** keys. This will enable AccuSnap when using an InRoads command.

26. Move the cursor to a point along the line string making sure the lines are not overlapping.

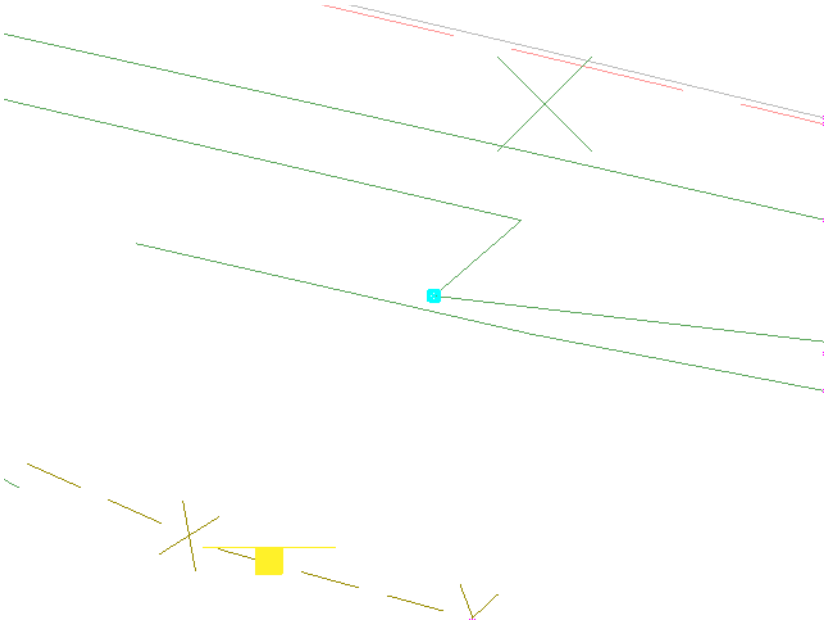


27. **<D>** a point in the MicroStation view to accept the point. The ***Edit Observation*** dialog will reappear. The new XYZ locations will be updated.



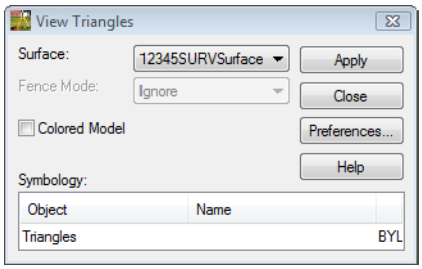
28. **<D>** the **Apply** then **Close** buttons.

29. Review your results dynamically from the fieldbook. The terrain breakline was restarted so the breaklines are no longer crossing.



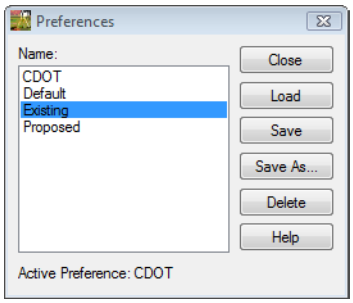
Lab 7.3 - Evaluate Surface Triangles

1. From the InRoads pull-down select, **Surface > View Surface > Triangles**. The ***View Triangles*** dialog will appear.



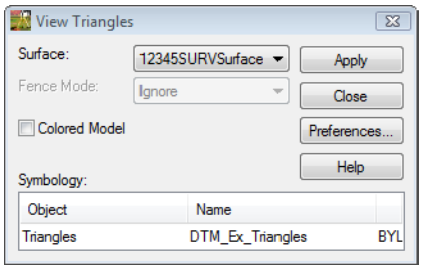
2. Verify **12345SURVSurface01** is the active surface.

3. **<D>** the **Preferences…** button. The **Preferences** dialog will appear.



4. Select the **Existing** preference.

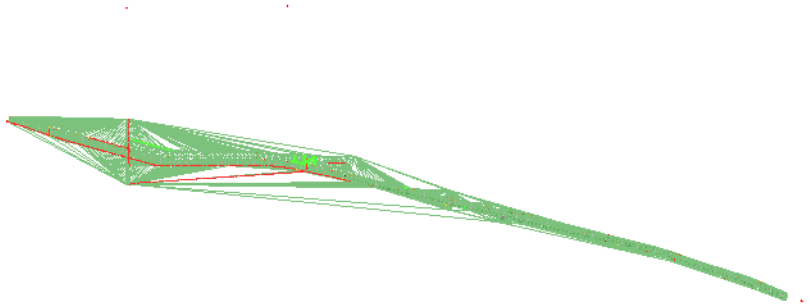
5. **<D>** the **Load** then **Close** buttons.



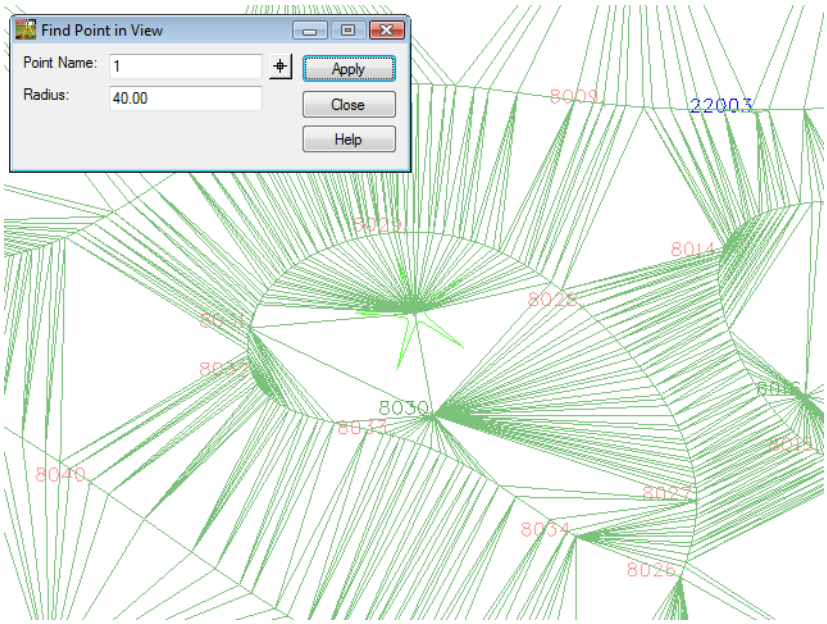
6. **<D>** the **Apply** button. The ***View Triangles*** dialog will minimize as the triangles are generated. The dialog will reappear when it is finished.

7. **<D>** the **Close** button in the ***View Triangles*** dialog.

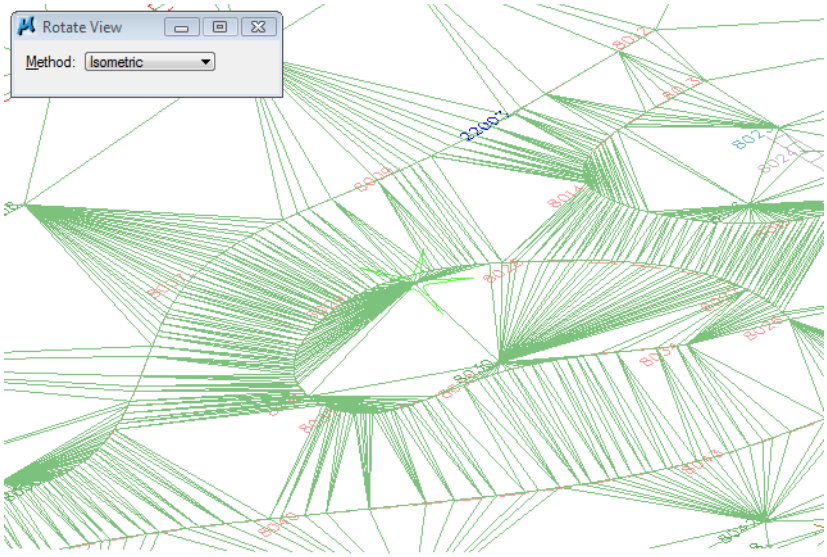
8. Using **MicroStation** viewing commands **Fit Active** to review your results.



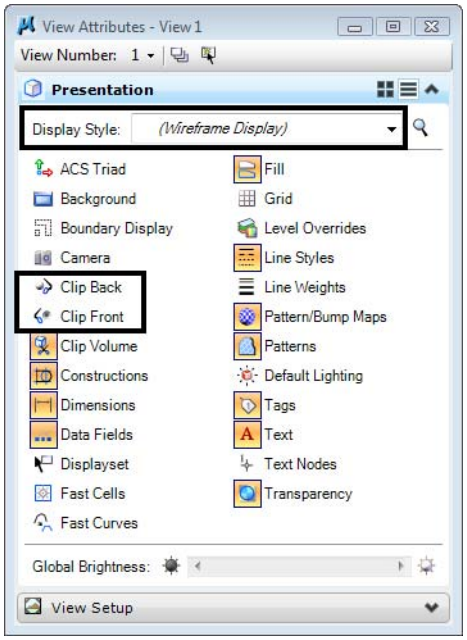
9. From the pull-down menu, select **Survey > Find Point in View**
10. Find ***Point Name:*** **1** Radius: **40**



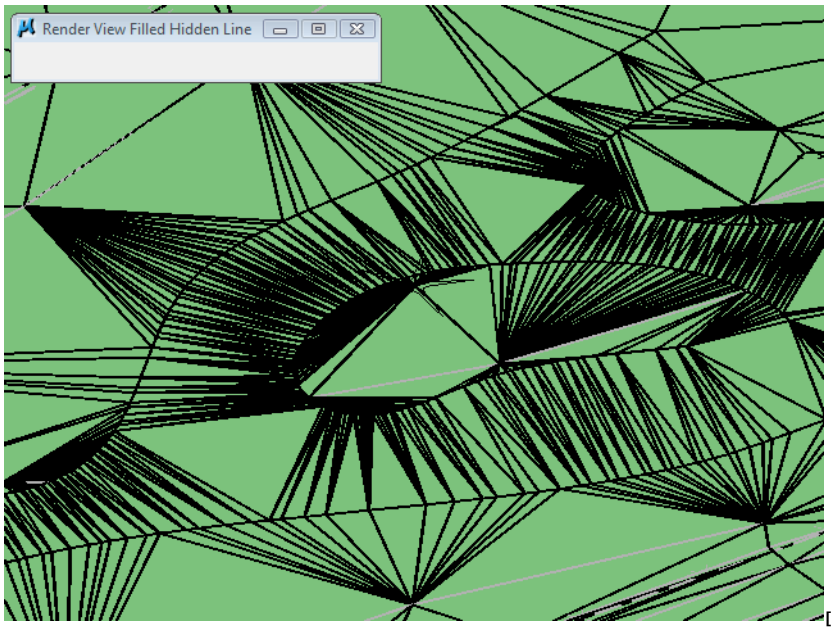
11. Using ***MicroStation*** viewing commands **Rotate View** to review your results.
12. From the tool settings dialog select **Method: Isometric**



13. If you can not see all the triangles in the view. Go to the MicroStation pull down **Settings > View Attributes** and check off ***Clip Back*** and ***Clip Front*** then **Apply.** Do not close the dialog.

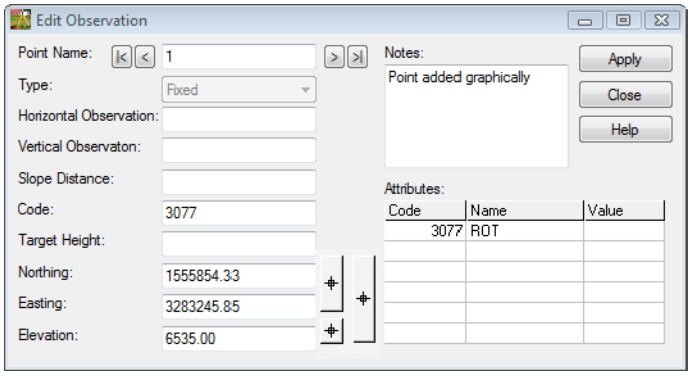


14. Continuing in the **View Attributes** dialog, set *Display Style* to **Filled Hidden Line**
15. Place a **<D>** in **View 1**
16. Review your results

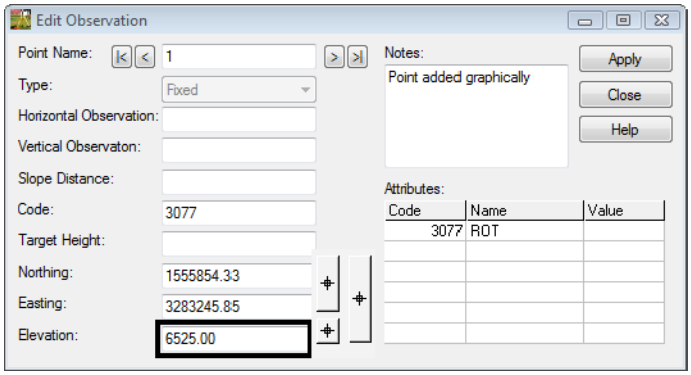


Note: The tree feature code 3077 that was added to the fieldbook had the elevation incorrect. The elevation error will be corrected back in the fieldbook.

17. Locate point name **1** in the fieldbook using the **Select Observation** button from the ***Fieldbook Data*** dialog.
18. **<R>** the point name **1** and select **Edit** from the shortcut menu or double click the point name. The ***Edit Observation*** dialog will appear for point ***1***.



19. Key-in the ***Elevation: 6525.00***



20. **<D>** the **Apply** then **Close** buttons.

21. From the View Survey toolbar toggle **ON View Planimetrics**

22. Review your results.

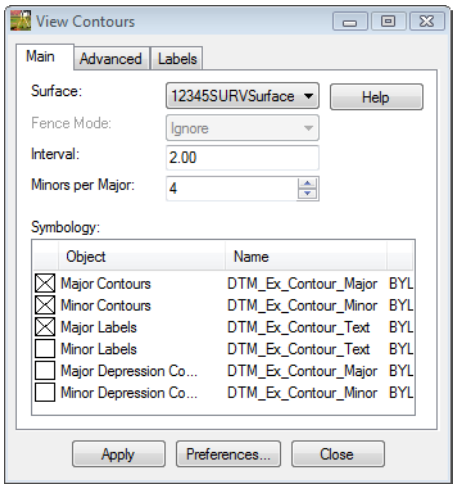
    Note: The fieldbook data is now correct when the fieldbook is re-exported the Survey data to Surface the surface data will be corrected also.

23. From the View Survey toolbar toggle **OFF View Planimetrics**

24. In the MicroStation view border **Rotate** view to **Top**

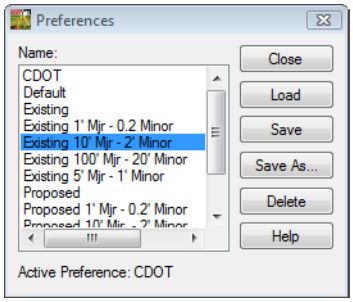
Lab 7.4 - Evaluate Surface Contours

1. From the InRoads pull-down select, **Surface > View Surface > Contours**. The ***View Contours*** dialog will appear.



2. Verify **12345SURVSurface01** is the active surface.

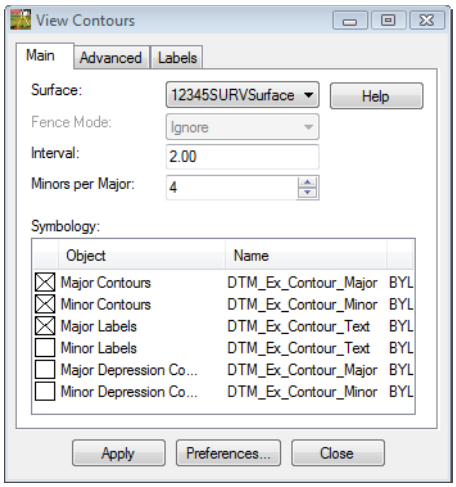
3. **<D>** the **Preferences…** button. The **Preferences** dialog will appear.



4. Select the ***Existing 10' Mjr – 2'Minor*** preference.

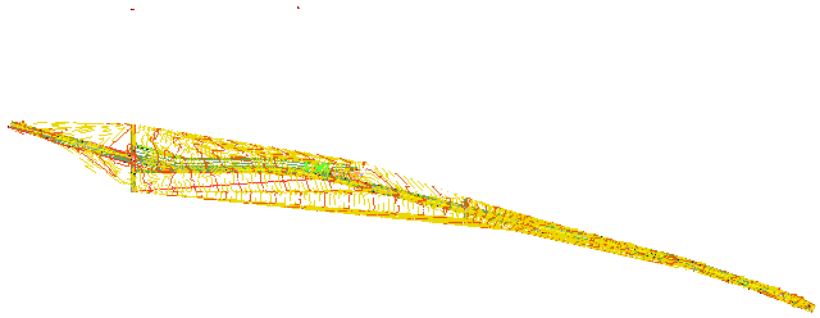
5. **<D>** the **Load** then **Close** buttons.

6. **<D>** the **Apply** button. The **View Contours** dialog will minimize as the triangles are generated. The dialog will reappear when it is finished.



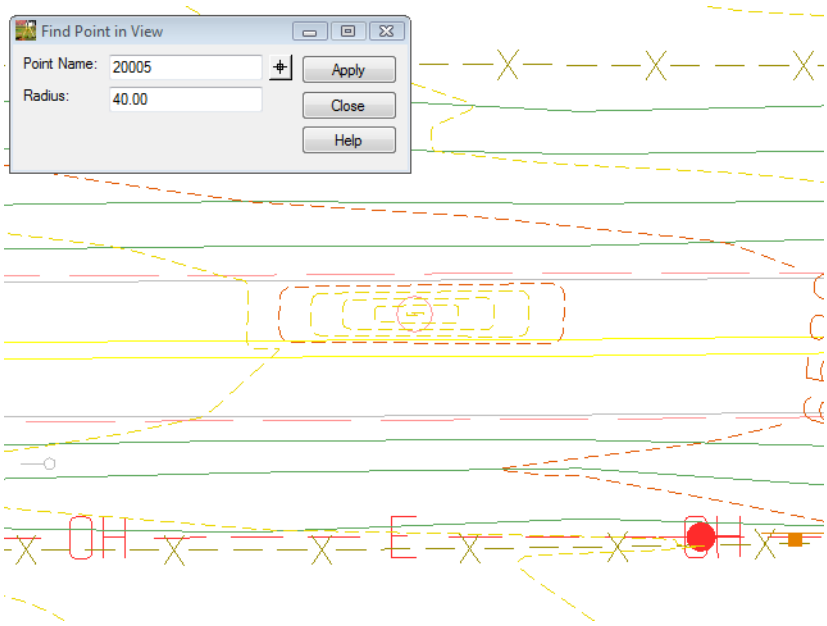
7. **<D>** the **Close** button in the **View Contours** dialog.

8. Using ***MicroStation*** viewing commands **Fit Active** to review your results.



9. From the pull-down menu, select **Survey > Find Point in View**

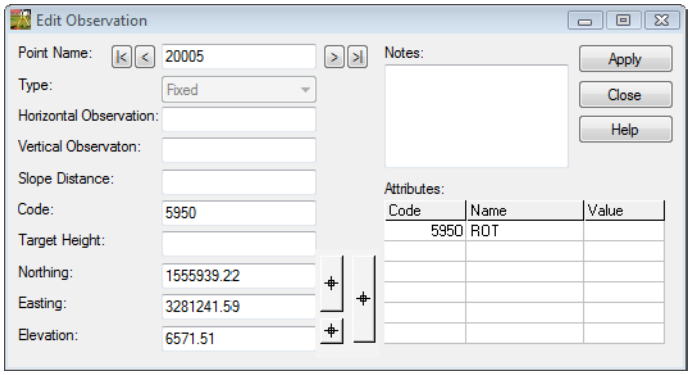
10. Find ***Point Name:*** **20005** Radius: **40**



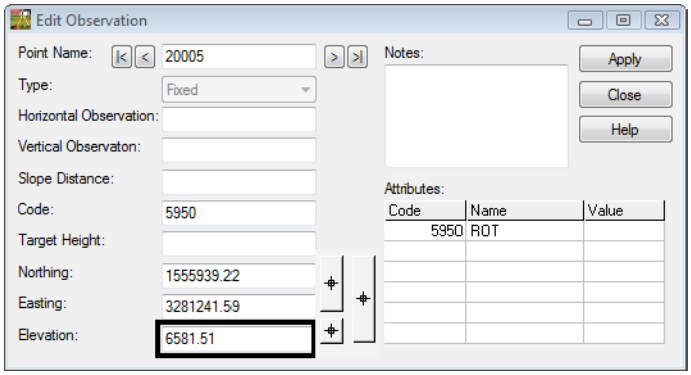
Note: There is a problem with a random point in the roadway. The test hole location that were imported with the import wizard has a busted elevation.

11. Locate point name **20005** in the fieldbook using the **Select Observation** button from the ***Fieldbook Data*** dialog.

12. **<R>** the point name **20005** and select **Edit** from the shortcut menu or double click the point name. The ***Edit Observation*** dialog will appear for point ***20005***.



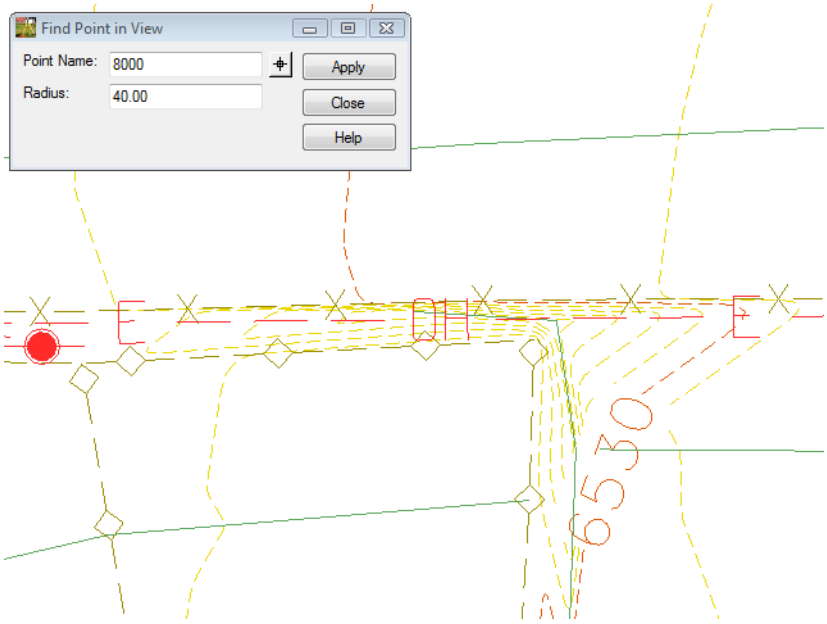
13. Key-in the ***Elevation***: ***6581.51***



14. **<D>** the **Apply** then **Close** buttons. The elevation will be corrected for the final DTM export.

15. From the pull-down menu, select **Survey > Find Point in View**

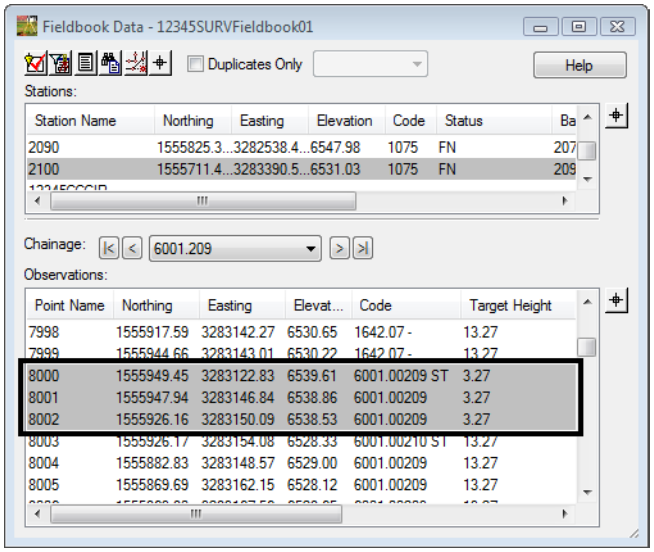
16. Find ***Point Name***: **8000** ***Radius***: **40**



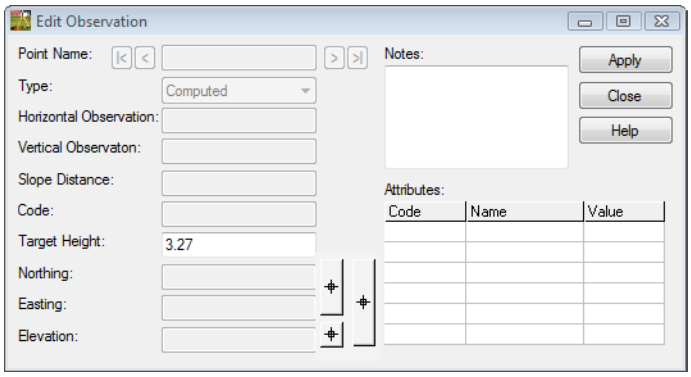
Note: There is a problem with the breakline. The breakline has a bust in the rod height.

17. Locate point name ***8000*** in the fieldbook using the **Select Observation** button from the ***Fieldbook Data*** dialog.

18. **<D>** the point name ***8000*** then hold down the **Shift** key and select point name ***8002***.

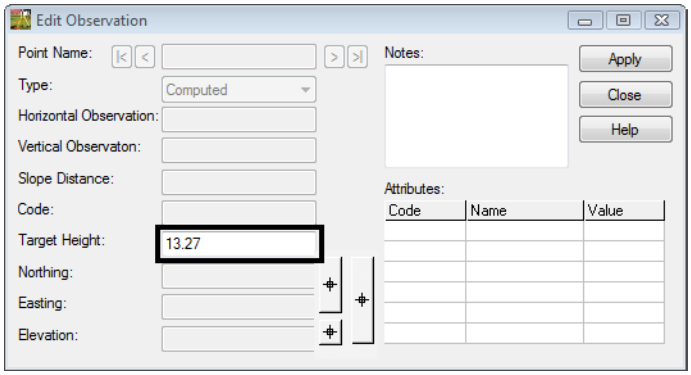


19. **<R>** the selected list and select **Edit** from the shortcut menu. The ***Edit Observation*** dialog will appear.



Note: The target height is the only field that can be edited because it has the same value for all 3 points.

20. Key-in the ***Target Height:*** **13.27**



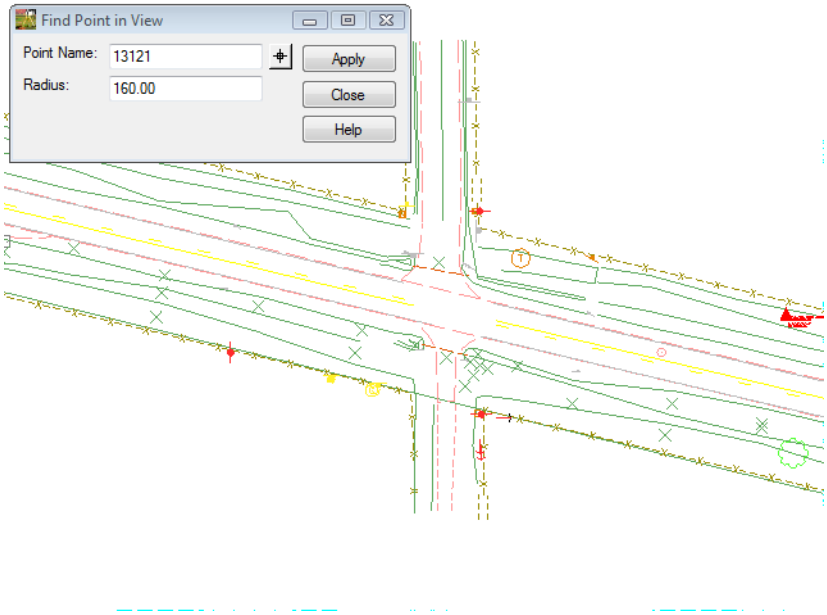
21. **<D>** the **Apply** then **Close** buttons. The elevation will be corrected for the final DTM export.

Note: The fieldbook data is now correct when the fieldbook is re-exported the Survey data to Surface the surface data will be corrected also.

22. Save the Survey fieldbook. From the Workspace Bar **<R>** on **12345SURVFieldbook01** select **Save** from the shortcut menu.

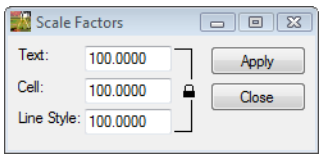
Lab 7.5 - Multipoint Profile as Section check

1. From the pull-down menu, select **Survey > Find Point in View**
2. Find ***Point Name:*** **13121** Radius: **160**

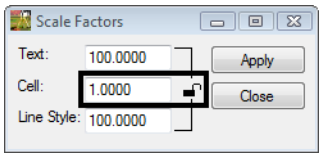


Note: Using the Multipoint Profile command will be used to evaluate key areas such as this culvert crossings.

3. Using MicroStation Level Display, **Turn OFF** all Terrain levels as shown above.
4. From the pull down menu select, **Tools > Global Scale Factors…** The ***Scale Factors*** dialog will appear.

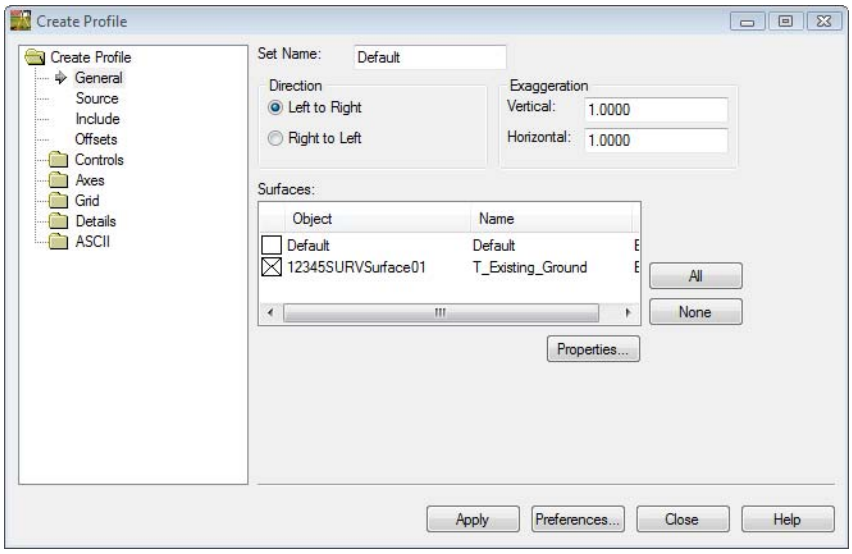


5. If Global Scale Factors is not an option go to the InRoads pull down menu and select: **Tools > Application Add-Ins > Global Scale Factors Add-In**
6. **<D>** the **Lock** button. The button display will change showing as unlocked.

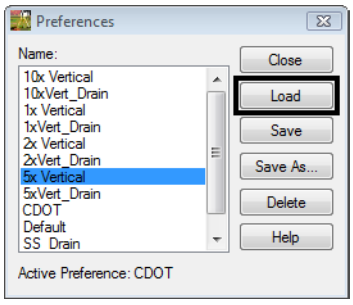


7. Key-in scale **Cell: 1**
8. **<D>** the **Apply** then **Close** buttons.

9. From the pull down menu select, **Evaluation > Profile > Create Profile**. The ***Create Profile*** dialog will appear.



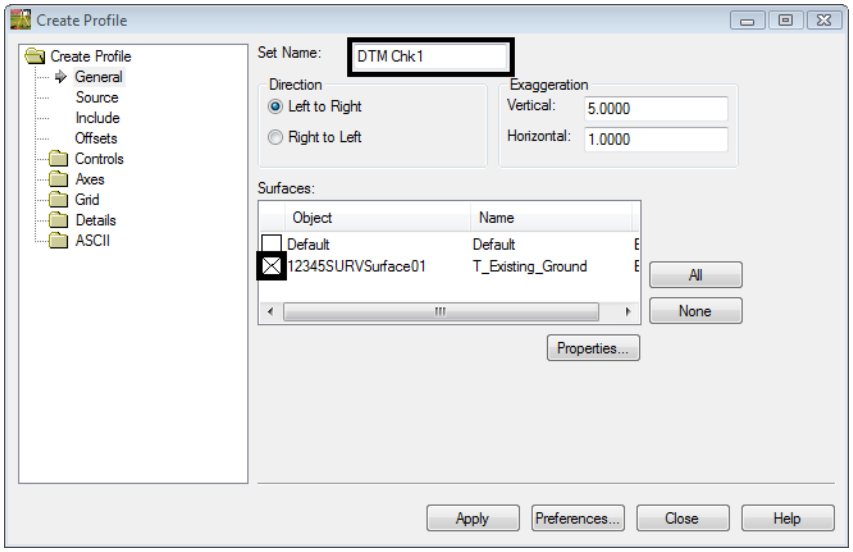
10. **<D>** the **Preferences...** button. The **Preferences** dialog will appear.



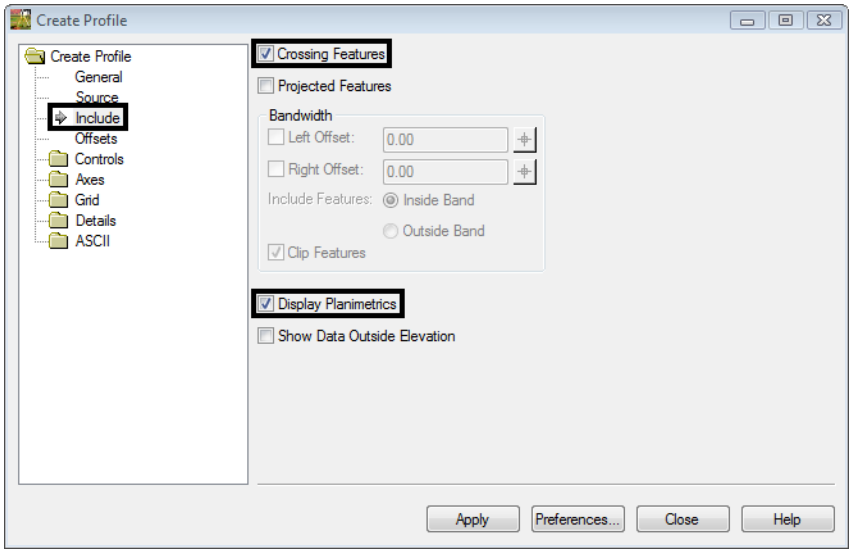
11. Select the preference name **5x Vertical**

12. **<D>** the **Load** then **Close** buttons.

13. On the **General** leaf key in ***Set Name***: **DTM Chk1**
14. Verify **12345SURVSurface01** is checked in the ***Surfaces*** section.



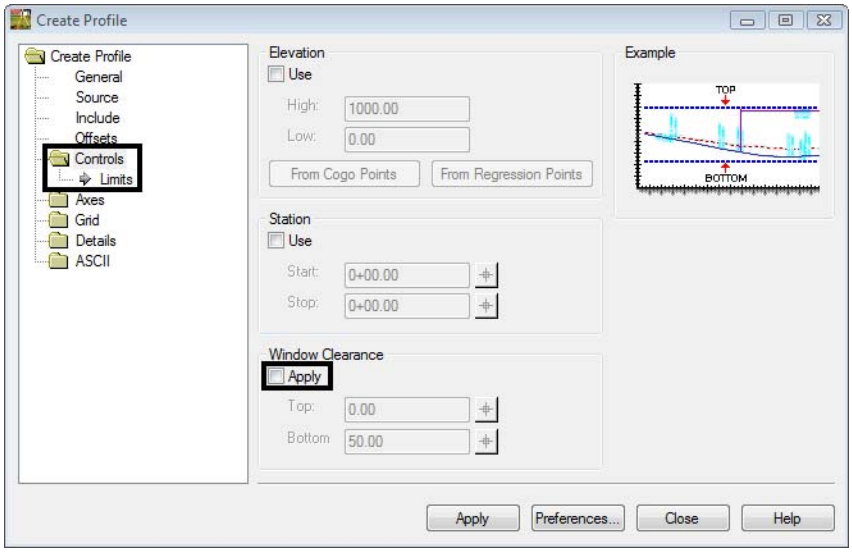
15. **<D>** the **Include** leaf.



16. **Check ON** the ***Crossing Features*** box.
17. **Check ON** the ***Display Planimetrics*** box.

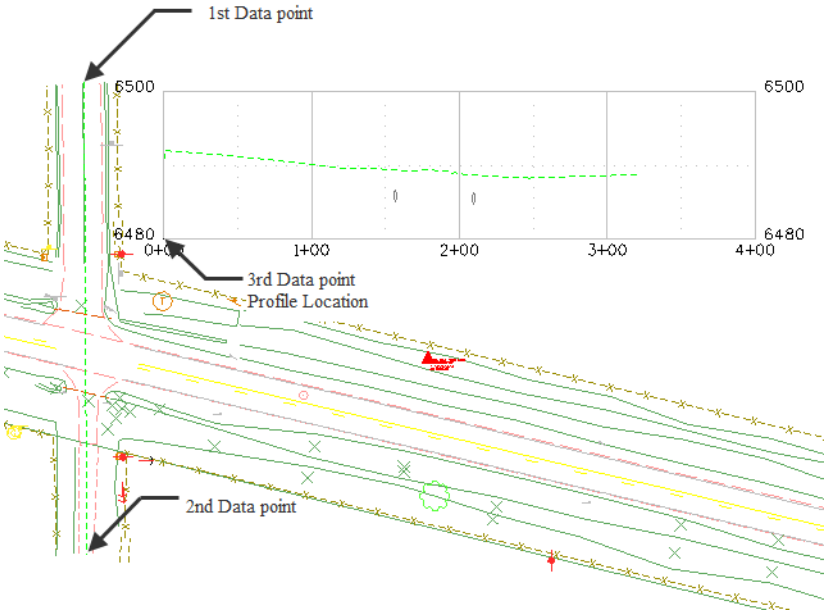
18. **<D>** the **Controls > Limits** leaf.

19. **Check Off** the ***Window Clearance Apply*** box.



20. **<D>** the **Apply** button. The dialog will minimize allowing you to select points in the MicroStation view.

21. **<D>** a point in the MicroStation view at the north end of the and center of the road.
    - There is no need to hold down on the Left mouse button.
22. Move the cursor, a line will begin to generate



23. **<D>** a second point perpendicular across the roadway crossing the culvert, as shown above.
24. **<R>** to quit defining profile extraction vertices.
25. **<D>** a location in the MicroStation view to draw the profile. The ***Create Profile*** dialog will reappear and the Profile is generated in the view.
26. Review your results.
27. Continue to Create Profiles at key locations.
    - Culvert Crossings
    - Driveway Entrances
    - Centerlines

When finished:

28. Using **MicroStation Delete** button. Delete all DTM Check profiles.
29. Save the Survey fieldbook. From the Workspace Bar **<R>** on ***12345SURVFieldbook01*** select Save from the shortcut menu.